Received: 25 February 2021 | Revised: 19 May 2021 | Accepted: 25 May 2021

DOI: 10.1111/jep.13593

COMMENTARY

Journal of Evaluation in Clinical Practice
International Journal of Public Health Policy and Health Services Research

WILEY

Working as an embedded researcher in a healthcare setting: A practical guide for current or prospective embedded researchers

Gurpreet Reen PhD | Bethan Page MSc | Eirini Oikonomou MSc

Department of Experimental Psychology, University of Oxford, Oxford, UK

Correspondence
Bethan Page, Department of Experimental Psychology, University of Oxford, New Radcliffe House, Radcliffe Observatory Quarter, Oxford OX2 6GG, UK.
Email: bethan.page@psy.ox.ac.uk

Funding information
Economic and Social Research Council, Grant/Award Number: ES/J500112/1

1 | BACKGROUND

The importance of empirical research to improve the quality and safety of healthcare is well-established.[1] However, there are many challenges to implementing research into clinical practice.[2] Much of the research produced is not sufficiently focused on the priorities of clinicians and organizations, does not offer feasible recommendations for clinicians or cannot be easily adapted into complex clinical systems.[1] Meanwhile, healthcare organizations do not typically make much use of research to inform their practice or rigorously evaluate improvements to their service.[3] One reason may be that among the vast body of clinical research, it can be overwhelming and time consuming for clinicians to discern the important evidence whose results are ready to be implemented into clinical practice.[4] Another challenge is that complex – and often conflicting – national guidelines encourage the implementation of clinical procedures which are not always evidence based.[4] This impedes the application of research knowledge into practice resulting in wasted time and effort.[3] One way to address the gap between research evidence and clinical practice is to embed researchers within healthcare organizations.[5]

McGinity and Salokangas defined embedded researchers as 'those who work inside host organisations as members of staff, while also maintaining an affiliation with an academic institution'.[6] Specifically, embedded researchers become a core member of a host organization in order to co-produce projects alongside staff, build the research capacity of the host organization and gain access to contextual information to produce research that is closely aligned with the services on the ground.[7] Embedded research often involves co-production: research is typically led by the priorities and insight of frontline clinical teams (and sometimes patients too), and is often much more collaborative than traditional health services research. While some of the research they conduct within the organization may be akin to participatory research,[8] this is not a necessary or required role of the embedded researcher. Many embedded researchers will also be expected to have an affiliation with an academic institution or be supervised directly by an academic, but this may depend on the 'degree of embeddedness' of the researcher.[7]

To ensure that the embedded researcher role is conducted effectively, it is important to understand the experiences of researchers embedded in clinical practice and consider how they can be best supported. Recent papers on embedded research state that researchers should typically undergo a process of immersion within the host clinical organization, which should lead to robust translational research over time.[7,9-12] These papers also report some challenges of the role, such as relationship building with clinicians and difficulties maintaining professional identity,[12] but do not provide suggestions on how to resolve these challenges and are mainly focused on the impact of embedded researchers' work on organizational decisions and service delivery.[13] It is important to understand the direct experiences of researchers who have actually been embedded within a host organization.

The authors of the present paper have worked for several years as embedded researchers in quality improvement centres working on projects across acute hospitals, mental health and community services (including multi-site projects and small projects on individual wards), while also being affiliated to a university, and have had other roles as health service researchers based in universities. In this paper, we share our experiences of working as embedded researchers in

healthcare settings by examining the benefits and challenges of this role within the context of the wider literature on embedded research, and also set out practical recommendations for researchers working or wanting to work in this area.

2 | THE BENEFITS OF WORKING AS AN EMBEDDED RESEARCHER

The benefits of working as an embedded researcher are wide-ranging. From our collective experience we found that an embedded researcher becomes quickly aware of the priorities of the clinical setting, not just the gaps in the literature. This allows the embedded researcher to pursue research which is truly focused on the needs of clinicians and patients and interpret results with a better understanding of the clinical environment.[1,14] A track record of 'impact' and a better understanding of the clinical context may also help to secure future grants and fellowships. Within a health care institution, an embedded researcher will have opportunities to grow their network of clinical collaborators which can be invaluable for their future career.[1]

People who work as embedded researchers develop additional skills in this role beyond the core research skills typically gained from working in an academic setting.[11] They also learn to communicate key ideas to a range of audiences, for example, by presenting their ideas to frontline clinicians, senior managers, and patients. Researchers will learn new skills by working closely with clinicians, and clinicians in turn will also learn new skills from the researchers. Researchers are trained to assess the evidence base, to analyse data, to use theory to guide research and to approach problems systematically. In addition, they will directly and indirectly teach some of these skills to clinicians, and potentially also change their views on the value of research. Researchers can emphasize to clinicians the importance of using research methods that can account for the inherent bias of conducting projects in an applied setting, as well as the importance of systematically evaluating initiatives that are already happening in the organization.[3,15] Rapid literature searches can prove really valuable and can help prevent projects from re-inventing the wheel.[3] Evaluating real-world projects is another challenge for clinicians and researchers alike: researchers' ability to think systematically and analyse data in many forms can be invaluable to the organization. We found that working from a clinical setting allows easier access to clinically relevant data than what we typically had working from a university.

Finally, we would like to comment on how enjoyable it can be to work in a team of clinicians. Each side brings different perspectives and both researchers and clinicians have a lot to learn from each other.

3 | THE CHALLENGES OF WORKING AS AN EMBEDDED RESEARCHER

There are many challenges of the role, both for individual researchers, and for clinicians and organizations. Much of the research carried out as an embedded researcher will be collaborative and rely heavily on the time and support of clinicians. The co-ownership of knowledge can be challenging.[1,5,7,16] Researchers and clinicians sometimes have conflicting priorities; researchers are trained to conduct studies in a systematic manner and publish them in academic journals, whereas clinicians require more immediate improvements to patient care often in the face of regulatory pressures.[1,7] The tension between maintaining high standards of rigour while trying to be flexible to the needs of clinicians can place embedded researchers in a difficult position.[16] Embedded researchers may sometimes feel pressured to provide support within strict time frames or may have to compromise with reliable data collection procedures. As a result, the quality of research may be weaker than intended and good science practices may be overlooked. We have frequently experienced pressure to introduce interventions quickly due to pressure from clinicians, management or regulators before collecting the necessary baseline data or sufficient data to fully diagnose the problems: poorly designed interventions may not have the intended impact, and without adequate baseline data sometimes we cannot tell if the intervention was successful in its aims.

We also found that the focus on the clinician's objectives can have a negative impact on our own research identity and objectivity.[12] On several occasions, projects that we supported lost momentum or stopped altogether due to clinical pressures outside of our control which can be frustrating. This also means that some projects we have supported will not be published (although it may be possible to publish the learning from failed or incomplete projects). To mitigate some of these challenges and maintain our research identity, we found that it was important for us to remain closely connected to the academic institution we were affiliated to and ensure that we received regular input and perspective from other researchers.

Another challenge for an embedded researcher is to manage clinicians' perceptions about the role of a researcher, such as the perception that researchers come from an 'ivory tower' or are naive to the complexities of a clinical environment. Evidently, an embedded researcher may be met with resistance if the evidence does not support the clinician's or organization's experience or views. However, embedded researchers will need to continue to be transparent in the work they produce within the organization to ensure that objectivity of the research work is maintained.[12] To do this, we reminded the organization of the purpose of our role, and sought the support from the academic institution or our supervisor. Ultimately, it is the role of an embedded researcher itself that can help to break down the barriers between researchers and clinicians, and lead to better translational research.[5,7,16]

Doing research in a clinical organization where participants may also be fellow co-workers elicits some ethical considerations. For instance, ensuring that informed consent is being granted at all times can be challenging. Clinicians who work with embedded researchers may be involved in several stages of a research project; conceptualisation, interviews, focus groups, evaluation and so on.[17] Although they may have consented to take part in a study, it is unclear whether consent covers the full spectrum of their role in co-producing

research knowledge.[8,18] Another ethical consideration is whether consent should be granted by other colleagues who may be present and indirectly participate in discussions that help embedded researchers conduct their research projects.[8] Developing relationships with clinical teams to understand their work and identify issues for further research is essential for an embedded researcher, and it is not usually an ethical concern when clinical teams are not the subject of a research study. However, working with colleagues that may also be research participants poses the challenge of maintaining academic integrity during data collection and analysis and raises confidentiality and anonymity concerns.[8,19]

Although some aspects of clinical research can become easier when embedded in a clinical setting (e.g., producing impactful work, access to data and clinical teams), we found substantial time and

TABLE 1 Key benefits and challenges of working as an embedded researcher

	Benefits	Challenges
Producing research	Research is grounded in the priorities of clinicians and the organization, and therefore more impactful. Knowledge is co-produced.	Researchers and clinicians sometimes have different priorities which need to be balanced: researchers are trained to conduct studies to the highest standards of rigour, whereas clinicians require more immediate improvements to patient care often in the face of regulatory and organizational pressures.
Working closely with clinicians	Clinicians and researchers learn skills from each other and build close relationships.	Projects are heavily reliant on the time and support of busy clinicians and some projects may stop for reasons outside the control of researchers.
Skill development	Researchers will develop excellent communication skills, learn how to present and write for various audiences, including frontline clinicians, senior managers and patients.	Researchers may have less time available to develop core research skills, such as data analysis, teaching undergraduates, publishing papers, etc.
Career opportunities	Opportunities to develop clinical collaborations and projects for future funding applications, and a track record of 'impactful' research.	Time pressures as a result of multiple obligations to the organization and university can make it difficult to meet career goals, for example, publishing papers or applying for grants.

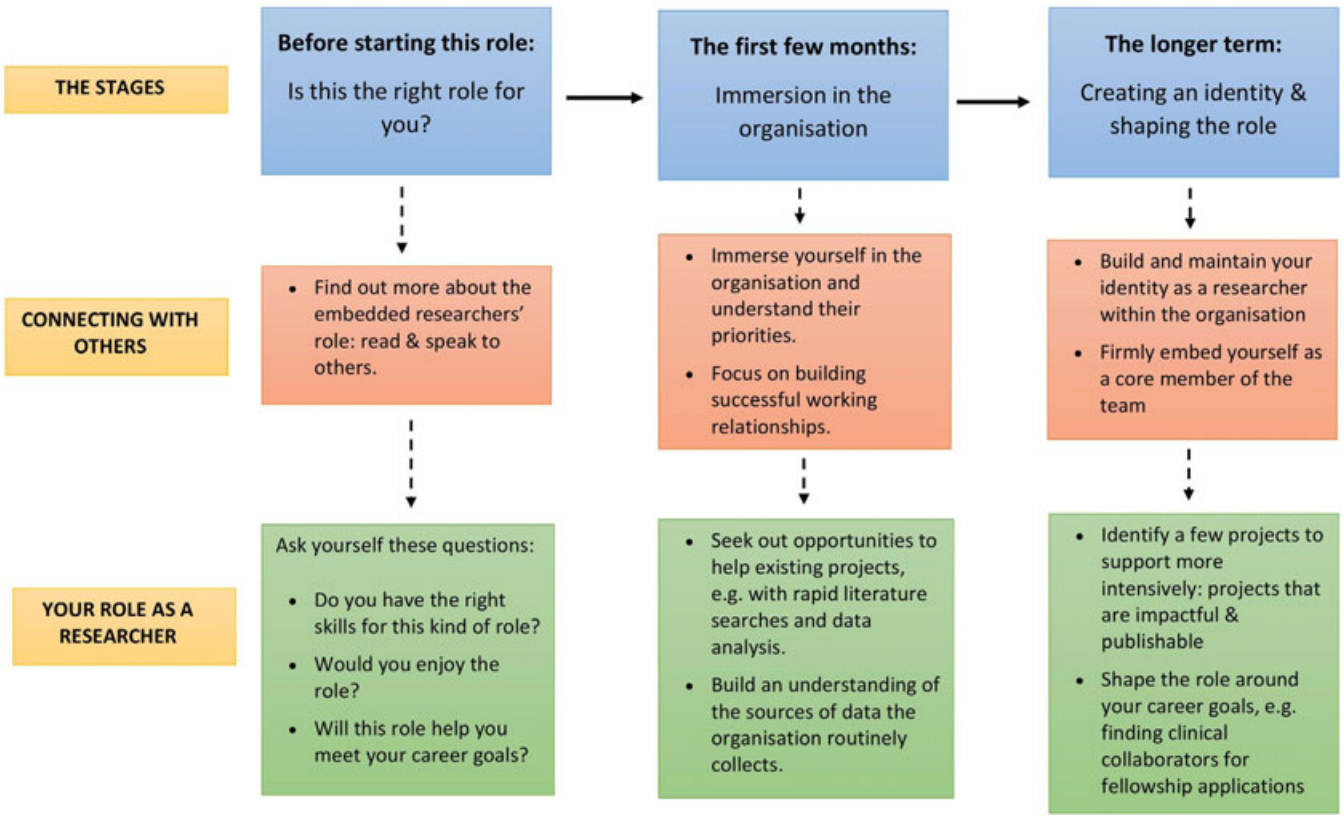

FIGURE 1 Key recommendations for working as an embedded researcher

effort is required to build relationships with clinicians. The embedded researcher also has an obligation towards the host organization, such as attending meetings, using new IT systems, and becoming familiar with a new language.[5] This will need to be balanced with the obligations towards the university and with the development of one's own research career. Many embedded researchers report struggling with the demands of both roles.[7] Feeling intellectual isolation is also common, and embedded researchers may feel detached from academic colleagues and the academic world.[5] Thus, we experienced that we had to make a trade-off between these roles at times. The balance will depend on the length of the role, the researcher's aspirations for their future career, as well as the support provided by the clinical organization and the research university.

In sum, the role of an embedded researcher is a positive and valuable experience, but can also be challenging at times. The key benefits and challenges are summarized in Table 1.

Box 1 Recommendations for embedded researchers

Before applying for the role:

- Consider speaking with others who have worked in these roles and read the literature on embedded researchers.
- Consider whether your transferable skills and experience, such as those gained in a healthcare or voluntary setting, could be helpful in managing this role. In particular, embedded researchers will need to be flexible, communicate and understand others, accept the ambiguity and conflict in their role and have the patience to develop a new way of working.
- When looking for roles, there are likely to be roles for health service researchers where you may have an opportunity to become 'embedded' in the clinical environment you are researching. It can also be advantageous to look for jobs directly supervised by a university-based academic. File S1 lists some key resources for further information on the embedded researcher role and ideas for finding job positions.

In the first few months:

- Focus on building working relationships with clinicians and become immersed within the healthcare organization. You will need to build trust and be seen as 'one of the team'. Having tea or coffee with people in your organization is time well spent, especially early on. Do not be afraid to ask your team to connect you with people. Take every opportunity to visit clinical settings, understand the priorities of the clinicians and the wider organization, and ask questions. It may be helpful to seek out other embedded researchers to discuss and share your experiences.
- It is best to spend much of your time working in the clinical setting especially in the first few months. Once you have built relationships there may be more scope for remote working. Regular videos meetings may be helpful, though are unlikely to be a substitute for working from the clinical setting.
- Become familiar with the relevant literature in your area and the data sources you may have access to. Routinely collected data may be imperfect for research purposes but may still be useful for identifying problems in the system and evaluating interventions.
- Projects you support in this early phase may not progress further, but you will gain valuable insight about how to approach future projects. With time, you will identify projects where there is a real opportunity to make a difference to services and patients alongside a committed team of clinicians.

Navigating the role:

- Over time, you should apply your research skills by evaluating projects, supporting intervention development, as well as having wider conversations with clinicians about how research can support clinical work. The transition to establishing your research identity within a healthcare setting will be challenging, but also essential to gaining the most out of the role.
- Once an established member of the team, we recommend prioritizing the projects that you support. This could be projects that are likely to have the most impact, are publishable, projects that suit your current and future research interests as well as organizational priorities, or projects that may lend themselves to further research questions to explore and potentially generate grants.
- Continue to reflect on the trade-off between your role as an embedded researcher and your academic role within the university (if you have one) which will be shaped by your interests and plans for future career. For example, you could steer your work to design some prospective studies or conduct other research work to help increase your academic output (eg, systematic reviews, data analysis, experiments), or collaborate with other researchers which would demand less of your time, while continuing to support the clinical organization.

4 | RECOMMENDATIONS FOR EMBEDDED RESEARCHERS

In Box 1, we present advice for researchers considering working as embedded researchers: after reflecting on our own experiences, we consider what researchers should be aware of before applying to the role, in the first few months of the role and how to navigate the role long-term. It is really important initially to develop a network and dedicate a lot of time to building relationships (e.g., by attending meetings, having coffee/lunch with clinical colleagues and really understanding the clinical needs of the organization) and scope out projects where a researcher's skills can make a difference. Over time, the researcher should shape the role to meet the organization's needs and their own career goals. Key recommendations are shown in Figure 1. A list of resources for researchers interested in working as embedded researchers is provided in File S1.

5 | IMPLICATIONS FOR ORGANIZATIONS AND FUNDERS

Embedded researchers can help healthcare organizations to make better use of research evidence and routinely collected data, support rigorous evaluation of improvement efforts and improve the quality of data they collect, as well as help build research capacity within the organization.[7,16] It is important for healthcare organizations, academic institutes and funders to make this role attractive for researchers and seek out researchers with the right skills for the role.[20] Our brief recommendations for how organizations can do this are set out in Box 2.

Box 2 Recommendations for organizations and funders

- Both clinical and academic organizations need to dedicate time to familiarize themselves with the embedded researcher's role and help explain the role to clinicians and academics.
- Both clinical and academic organizations should introduce the researcher to influential clinicians and stakeholders and invite them to key meetings.[20]
- Embedded researchers are likely to need good academic supervision to be successful and not feel academically isolated.[5] This is especially important as embedded researchers can have a greater risk to academic career development, due to producing less academic output than other researchers, working on less rigorous studies or studies that do not get completed for reasons outside their control.[16]

Academic and clinical institutions need to work together to consider how to fairly reward the work of embedded researchers, acknowledge their valuable role and ensure that career progression is not hampered. This could include creating specific career pathways or unique funding opportunities for this role.[21]

6 | CONCLUSIONS

In this paper, we have reflected upon our experiences of working as researchers embedded in health services organizations while being affiliated with an academic institution. We have discussed the benefits as well as the challenges informed by our experiences and wider literature, and suggested practical recommendations targeted to researchers thinking of pursuing this role.

Future embedded researchers should prepare for this challenging but valuable role and learn from the experiences of others who have been in this position. Clinical and academic organizations need to support embedded researchers by rewarding their efforts and developing a more defined career structure to mitigate some of the risks of this role. We need to attract more people to work as embedded researchers, and learn from those currently in these roles. Ultimately, embedded researchers will help to generate more impactful research informed by the clinical context and help organizations to use research evidence at all levels of their service if supported in their unique roles.

ACKNOWLEDGEMENTS

The authors would like to thank Charles Vincent, David Hunt, Keegan Shepherd, Rasanat Nawaz and Ruta Buivydaite for their discussions and comments on the paper. The authors did not receive any funding for this work. Bethan Page is supported by the Economic and Social Research Council [grant number ES/J500112/1].

CONFLICT OF INTEREST

The authors declare they have no conflict of interest.

AUTHOR CONTRIBUTIONS

Gurpreet Reen, Bethan Page and Eirini Oikonomou: Conceived the idea for the manuscript, discussed and synthesized the key and relevant points, and contributed to the writing of the manuscript. All authors contributed equally to all aspects of the manuscript. All authors read and approved the final manuscript.

ETHICAL APPROVAL

No ethical approval required for this study.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ORCID

Gurpreet Reen https://orcid.org/0000-0002-2634-6662
Bethan Page https://orcid.org/0000-0002-9937-6176
Eirini Oikonomou https://orcid.org/0000-0001-8408-9476

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Reen G, Page B, Oikonomou E. Working as an embedded researcher in a healthcare setting: A practical guide for current or prospective embedded researchers. *J Eval Clin Pract*. 2022;28:93–98. https://doi.org/10.1111/jep.13593